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FUNCTIONAL ASSESSMENT IN THE 80's
A CONCEPTUAL ENIGMA, A TECHNICAL CHALLENGE

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Functional Assessment in the 80s:
A Conceptual Enigma, A Technical Challenge

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The inherent complexity of rehabilitation is itself mirrored in the complexity of assessment issues. As our early concepts of rehabilitation were concerned with a narrow pathology-oriented view of the individual, so too were our concepts about assessment. However, unlike our conceptual views, our current views of rehabilitation focus attention more clearly on problems associated with environmental functioning and adaptation. We are only now beginning to seriously consider modifying traditional assessment strategies to keep pace with these modern developments. Unfortunately, the strength of our previous assessment habits and the complexity of our recent history have slowed the process of change.

Our current views of rehabilitation refer to a process of integrating persons with physical or mental impairments into community life. In cases of an acquired injury or disorder, this process is one of readaptation to community living. However, for persons born with disabilities or those with developmental disabilities, rehabilitation is primarily a learning process (Bitter, 1979). In either case, the aims of this integration effort are to assist these individuals in obtaining those roles, rights, and responsibilities which define life in the surrounding community.

Rehabilitation today is more concerned with the interface between the impaired individual and his or her surrounding

environment. In fact, environmental adaptation and functioning are seen as the most basic rehabilitation issues (Alexander and Willems, 1981). We expend a portion of our professional energy attempting to understand the abilities, interests, and potential capabilities of persons with impairment as well as the demands placed upon them by their particular environments. The remainder of our effort is aimed at improving this relationship through enhancing personal abilities and skills or through environmental modification. In the end, the most we can do is to assist clients "to mobilize their own resources, decide what they wish and are able to be, and achieve goals through their own efforts and their own ways" (Jaques, 1970).

All of what we do in rehabilitation depends upon our abilities to make appropriate, reliable and valid assessments of those variables that facilitate the rehabilitation process. These assessments serve as the basis for all professional service activity including (1) determination of eligibility and compensation levels, (2) setting IWRP goals and treatment strategies, (3) determination of service outputs (such as client change or exit criteria), and (4) institutional administration and manpower planning (such as determination of costs/benefits, service needs, service planning and program effectiveness). When properly aggregated in a well-defined and smoothly running system, these data can serve the broader needs of policy development and comparability of research.

As professionals have attempted to meet assessment needs for this modern view, it has become obvious that former assessment strategies are no longer adequate to the task. The rehabilitation literature in all disability categories abounds with professional criticism over many assessment methods and devices in use today. Where former assessment methods were primarily concerned the identification of traits, aptitudes, and medical diagnostic criteria associated with the etiology of impairment, they give no clues as to actual environmental functioning and adaptation of the individual. In addition, these methods tend to generalize inabilities and deficits that we have come to learn are not so. Consequently, our assessment strategies too often fail us today.

While we have at our collective disposal a myriad of programs, services, methods, and techniques for facilitating the rehabilitation process, all of which have proven useful some of the time, we are not very good at predicting when and with which clients. A case in point (Cook, 1978) is the study of the validity of training recommendations resulting from vocational evaluations of clients entering a large comprehensive rehabilitation center. According to the author, the purpose of vocational evaluation in the setting was to determine what adjustment and vocational services clients should receive. A basic assumption made was that the comprehensive rehabilitation team could determine a vocational diagnosis that leads to successful training

and treatment outcomes by combining both information and professional expertise about medical, psychosocial, and vocational functioning. Among his conclusions, the author notes

While there was a positive and significant relationship between completion of a center vocational training program and subsequent employment, completion of training was independent of recommendations made in evaluation In this particular setting, it probably would have been just as effective, and much more efficient, to have assigned clients to different service modalities by drawing recommendations out of a hat. (p. 12)

Assuming that the technical aspects of the research are impeccable, there are two possible responses to the author's conclusions. First, one might ask whether gainful employment is an appropriate indication of the success of vocational treatment and training. It is an assumption stated by the author, but is it legitimate when recent research shows that gainful employment of disabled persons is a function of many variables outside the client's control (Noble, 1979)? Perhaps the question should be, is success appropriately measured against an outcome of acquired or improved skills, or is it best measured against the outcome of gainful employment? The second point concerns the technical quality of the assessment devices that were used. Goldfried and Kent (1972) suggest that the purpose of any assessment device is to make predictions about behavior. If one cannot make better than chance predictions, such as drawing decisions out of a hat, then this brings into question the reliability and validity



characteristics of the particular device and its appropriate use for the given situation.

As our concepts of rehabilitation have evolved, and rehabilitation professionals have become more interested in client adaptation to and functioning in the environment, traditional assessment methods have become problematic. A current trend in rehabilitation assessment is the development of functional assessment systems to replace traditional assessment strategies. This trend stems from a major shift in rehabilitation philosophy and practice which occurred in the early 1940s. Now, functional assessment methods are aimed toward classifying and evaluating clients' abilities to perform in their environment, and away from delineating diagnostic labels, traits, and aptitudes which characterized the functional approach. According to Granger (1980), functional assessment refers to the measurement of dynamic characteristics of the individual including activities, skills, performances, environmental conditions, and needs.

The U.S. Department of Education (1982) has noted that today, functional assessment is considered to be highly central to rehabilitation concepts and efforts. However, it has received no official sanction or agreed upon definition by any professional group interested in disability. This may in part be due to the lack of a strong theoretical or conceptual base, as many functional assessment devices were developed to meet specific

institutional needs and thus have reflected the concerns of a particular facility and its clients. Scales and inventories were designed to meet a variety of assessment concerns, for example, for determining treatment and service goals, for client tracking and evaluation, and for purposes of state and federal accountability.

While intra-institutional programs were enhanced with the use of these tools, they have effectively served to confound communication efforts across institutions. The diverse purposes of many functional assessment devices has led to confusing terminology, poor communication among professionals (especially across disciplines), inefficient coordination of reviews at local government levels and incomparability of research findings (U.S. Department of Education, 1982).

The following paper is an attempt to further explore functional assessment issues. In doing so, I have felt it necessary to begin with a definition of assessment and a brief review of the role of assessment in human service systems, as I suspect we have had a tendency to forget the critical elements of this relationship. Next, I will provide a historical overview of functional assessment in rehabilitation. Following this, I will present what I view as the current conceptual and technical problems with assessment as it relates to our current views of rehabilitation. Finally, I will end with a few remarks about potential solutions to the problems we face in assessment.



The Role of Assessment in Human Service Systems

To assess means "to sit beside" or "to assist the judge."

Appropriately, then assessment concerns the collection of data and the presentation of data in useful forms. Decisions about courses of action are made on the basis of data gathered and the interpretations of its meaning. (Anderson, et al., 1975)

Assessment is a broader term than either measurement or testing. It usually refers to multiple methods of gathering pertinent data (information)¹ on variables which are relevant to the particular decision-making process. The variety of techniques which are employed in assessments may include tests, questionnaires, naturalistic observations, ratings, and interviews (Sundberg, et al., 1977; Goldfried and D'Zurilla, 1969).

There are three kinds of assessment information required for the organizing and planning of human service systems. The World Health Organization (1980) advocates that such systems base this development on data which reflect (1) the nature of contacts made with the system, (2) how the system responds to these contacts, and (3) the outcome of contacts with the system. These data needs correspond to the many information needs in rehabilitation

¹The terms data and information are used interchangeably throughout this paper.

described above, including those associated with determining eligibility, treatment goals, manpower planning, outcomes, and cost effectiveness.

Information collected when a client first contacts a human service system can be compared with information collected upon exit from the system. By describing the client's status at the beginning and end of service delivery, the system can appropriately determine the presence or absence of change due to participation in the particular services provided. The ability to detect real and relevant change is of course a central issue.

How human service systems respond to contacts is also important information. Together with entry and exit data, administrators and researchers can then review a number of questions. Were specific services effective? How effective were they, given the resources that were made available? How often is the system required to respond to a specific inquiry? These and other questions are critical to making decisions about the functioning of various system components.

The overall effectiveness of human service systems cannot be determined unless a goal is clearly specified. Instead outcome goals are important and must be set so that real outcomes can be compared. Otherwise, two different services can only be compared with one another based upon adequate entry, service, and exit data. But the effectiveness of the system itself or the



effectiveness of either of the services is clearly dependent upon the originally intended goal of the system. Without this goal, the only comments that are relevant are relative; they concern the magnitude and direction of changes that occur as a result of service delivery.

Until more recently, the medical model of illness fit well with the organization and planning system described above. With clear intended goals of prevention and cure, it has been relatively easy to determine the effectiveness of many health care programs (WHO, 1980). It is instructive to apply the medical model to the organization and planning system.

1. Nature of Contact With the Health Care Facility

Within this model, contacts with the system are based upon the International Classification of Diseases (ICD). Diseases can most often be classified through assessment procedures that elicit some combination of clinical, subjective, and behavioral evidence (WHO, 1980).

An individual makes program contact with the knowledge that the program's goal is to prevent and cure illness and the subjective feeling that he or she is in a state of illness. The contact initiates a series of actions that result in either entry to or exit from the system. The health care professional begins the process of assessment with the purpose of determining the nature of the illness.

Subjective data is elicited from the potential patient about his or her perception of the problem - "where does it hurt?" "how long has it lasted?" "any recently related events?", etc. Subjective data may include: severe abdominal discomfort, general weakness, and a feeling of being feverish. Based upon the patient's description of the problem, the health care professional gathers various behavioral evidence. In this case, the evidence might include excessive coughing and display of discomfort to a touch of the abdomen on the right side. Subsequently, a number of clinical tests are ordered, some routine, others not so routine. These include an assessment of body temperature and a blood test to determine white blood cell count. Based upon all of the evidence, the professional makes a judgement ("diagnosis") that the patient has appendicitis, which is the most appropriate category in the ICD for this particular constellation of data. The system entry phase ends once the nature of the illness has been classified and a decision is made to provide service.

2. How the Health Care Professional Responds to the Contact

The next step is to determine how the program should respond to the nature of the contact. In the case of acute care facilities, little additional information is needed. According to the WHO (1980), sufficient information is

documented to direct the health care professional once a diagnosis has been established. However, in some cases, additional assessment data are needed. Documenting services rendered is rather straightforwardly laid out in manuals such as the International Classification of Procedures in Medicine, the Physician's Desk Reference, and other such publications.

3. The Outcome of the Contact

Data concerning the outcome of treatment are also rather straightforward. Based upon the intended goals of prevention and cure, one may quickly determine the system's effectiveness in responding to the original contact. An assessment is made of the patient's status with regard to the original diagnosis. A comparison is then made with the original data and with the goal (in the appendicitis this case cure) to determine the effectiveness of the program. In acute care programs, the presence or absence of disease is the primary data concern.

While there are still many many mysteries to unravel about illness and disease, the medical model remains a successful approach to problem solving when prevention and cure are probable outcomes. The medical field has developed a workable framework to guide the professional toward the overall system goals. Figure 1 illustrates the important

relationships between assessment and the data needs of the system. The data needs of the system are fairly easy to meet because of the relative and critical

Insert Figure 1 about here

correspondence between the various assessment methods and procedures, and the classification systems that have been developed. The nature of a system contact is basically classified by disease category. Similarly, the system response to the disease can be classified using manuals such as those noted above. Finally, the outcome of the services provided can be classified according to the existence or absence of disease or death.

Historical Overview

To better understand the complexity of issues associated with functional assessment, I will briefly review the historical developments associated with this concept. I have outlined these developments into roughly 20-year periods, as these seemed to make the most sense philosophically, conceptually, and practically. The development of functional assessment in the United States closely parallels the philosophical and legislative developments in rehabilitation itself. This is not so surprising since the nature of assessment, as we saw earlier, and the uses to which

assessment data are put, relate to expressed professional needs. As an inherent part of rehabilitation practice, it is reasonable to expect assessment approaches to change as our concepts of rehabilitation have changed.

At the outset, one should note that there are a number of terms appearing throughout the historical literature that loosely refer to the concept of functional assessment. It is instructive to mention these terms, if only to give a feel for the confusion that surrounds the topic and the breadth of reading required to make sense out of functional assessment efforts. The terms include the definition, measurement or evaluation of (1) health, (2) physical health, (3) functional limitation, (4) functional life, (5) functional ability, (6) disability, (7) impairment, (8) handicap, (9) health status, (10) vocational skills, (11) activities of daily living, (12) rehabilitation outcomes, (13) functional status, (14) functional levels, (15) chronic illness or disease, (16) sickness impact, and (17) quality of life. Within many of these, there are additional variations, such as disability, disabled, disablement, and ability.

Disability: A "Defect" With a Cash Value, 1920-1943

It has been reported that physical limitations due to impairment were the measurement aim of researchers in the mid-1800s (U.S. Dept. of Education, 1982; Wood and Badley, 1981). Their primary objective was to determine and classify the existence of

limitations in functioning in the general population. Carried out through health surveys, these measures were concerned with activity restrictions due to physical impairment.

However, the first sustained attempts to measure physical functioning began as a result of the worker's compensation legislation passed by the U.S. Congress in 1908. The legislation, entitled the Federal Employees Compensation Act, provided civil employees with medical benefits as well as reimbursement for any temporary or permanent physical inability to return to work. The notion of work compensation spread quickly, and by 1920 many states had invoked similar laws.

The worker's compensation law affecting civil service employees in the U.S. was directly modelled after the German system begun under Bismark in 1884. However, wage relief for accident or death actually dates back to fifteenth and sixteenth century Europe where mutual funds were developed by miners, railroad workers, and navigation workers. These were followed by state-run programs for workers employed in occupations considered indispensable to government security, i.e., navies and armies, but were later extended to other "indispensible" occupations such as those involved in road maintenance, railroad work, farming, and so forth (Kessler, 1970; Hildenbrand, 1956, McBride, 1963).

The primary assessment issue was measurement of loss of function. However, there was much disagreement as to how one went

about this. In 1919, Llewellyn suggested that function form the basis of evaluation for compensation. Disablement, in his view, did not refer to anatomic loss, but to the effect on function caused by the loss. He argued that from an anatomic loss point of view, the loss of two eyes results in total disablement and the loss of one eye must equal 50 percent disablement. However, from the functional view the loss of one eye most likely would not require even a change of occupation, and further the disability would be much less than 50 percent. Llewellyn suggested that this view (i.e., the measurement of function) is the only meaningful approach in the context of one's actual work activity; of course at this time narrowly referred to as occupation.

Llewellyn's view resulted in two problems. The first related to how one determined the characteristics of function. The second problem concerned the point at which a given injury or impairment affected job performance. This latter issue was a sticky one for physicians, who until 1958, essentially made all compensation decisions.

Between 1930 and 1958, there were many assessment procedures developed to measure what Llewellyn called the characteristics of function. According to Kessler (1970), the physician often based assessments on medical, occupational, economic, psychological, and social factors. Thus compensation decisions during this time were

determined from both medical criteria (for which there were no standards) and nonmedical criteria.

Kessler (1931) credits himself with developing the first set of standards by which to measure functional abilities. He proposed the use of physical units, such as degrees and pounds, to express range in motion and muscle strength, respectively. He felt hard-to-measure concepts (e.g., coordination) could be represented by deviations from test standards.

Another popular system was developed by McBride (1972). He proposed a ten-factor system divided into two major components: disabling physical impairments and disabling functional deficiencies. Disabling physical impairments include the following:

1. The anatomical and physiological mass tissue damage in limited motion (weakened back, osteophytosis, fibrosis)
2. The clinical manifestations (pain, tenderness, fatigue)
3. The restrictions toward work restoration (lifting, stooping, pulling, pushing, etc.)
4. The restrictions related to working conditions (coldness, dampness, irregular hours, etc.)
5. The intangibles or reactionary interference with recovery (limited opportunities for rehabilitation, unpredictable aggravation, progressive degenerative changes, recovery slowed by age).

The criteria for measuring disabling functional deficiencies included:

1. Quickness of action
2. Coordination of skills
3. Strength, stability
4. Security, self-confidence
5. Endurance.

Each of the above ten factors are rated on a "barometer of severity" scale from 0 to 100 which includes the following twelve-

point reference: 0 = negligible, 5 = mild, 10 = minor, 20 = moderate, 30 = moderate, 40 = substantial, 50 = severe, 60 = quite severe, 70 = very severe, 80 = extremely severe, 90 = profoundly severe, 100 = total.

A number of other systems were designed over the period to measure functional ability (Kessler, 1970; McBride, 1972; Rice, 1952). However, the system that was in greatest use by the end of the period, and still is today, contains the guides to rating physical impairment developed by the American Medical Association in 1958. The AMA makes clear the distinction between the evaluation of impairment and the evaluation of disability. Recognizing that the evaluation of disability requires measurement of nonmedical factors, the AMA concerns itself with the measurement of impairment. In their view then, functional assessment refers to measures of range in motion, angles of fixation, muscle tension - in short, the residual abilities of body parts to respond following disease or injury.

Rehabilitation Rather than Compensation - 1940-1960

A number of developments beginning in the late 1930s spurred new concern for our proficiency in describing and predicting the behavior of people with physical or mental impairments. No longer were the measurements of range in motion and muscle strength sufficient for determining rehabilitation services. Rehabilitation professionals became more interested in teaching the impaired per-



son to use and adapt residual capacities to reach maximum vocational and living potential, to get the most out of life.

Development of the concept of assessment during this period was affected by three general factors. Probably the most important conceptual factor was an acceptance of the holistic philosophy in rehabilitation. According to Straus (1965), the holistic concept of behavior stresses a basic interdependence among more traditionally recognized aspects of human behavior. Any response by the individual is a coordinated response that takes into account all his or her biological, learned, and environmental resources. These include:

human biology; the characteristic ways of feeling, thinking, acting, and relating to others that comprise personality; the nature of physical environment, including natural resources, topographical features, and the man-made environment; the social nature of man and the impact of significant social or reference groups, the nature of cultures, its potentialities and the limitations it imposes; and the significance of time and man's orientation to time as a key factor in the ordering and regulations of behavior. (p. 31)

This view is best summed up by what Kessler calls "effective dynamic action" of man. He suggests that failure to view the individual as a whole seriously detracts from our ability to evaluate disability. Since mind and body respond to problems in an integrated way, one cannot measure the functioning of separate structural units (such as the arm) and expect to understand the individual's ability to function in society. The "effective



dynamic action" of mind, body structure, and body function working as a single unit is the level of assessment required for an adequate understanding of man's residual abilities.

This view is clearly different from the fragmentation and specialization that characterized previous approaches to human problems in rehabilitation.

A second factor having an effect on the development of functional assessment was the dramatic increase in the number of people with physical impairment which commenced around 1940. Medical science and technology began reducing the death rate and prolonging life for a greater number of persons who would otherwise have died from the effects of disease, accidental injury, or war (Sokolow, et al., 1958; Sussman, 1965; Moskowitz, et al., 1957). The death rate dropped from 11.8 per 1,000 population at the introduction of antimicrobial drugs in 1937 to 7.5 per 1,000 population in 1960, a decrease of 4.3 persons per 1,000 population or nearly 36 percent (Rogers, 1981). However, this fantastic drop in death rate also parallels a dramatic increase in the incidence of chronic illness and a resulting need for long-term care.

Lehmann (1982) presents data that reveal a sharp increase in the mean percentage of persons 65 years or older in the total population between 1937 and 1960, yielding an overall increase of about 2.4 percent. In millions of persons, this increase represented nearly 7.2 million additional persons over the age of

65. Together with the increasing numbers of physically impaired persons due to advances in medical science and technology, the sheer fact of advancing age increased the population requiring long-term care. Traditional methods of medical diagnosis and classification of disease, and specification of anatomic deficiencies proved to be of little value in setting up treatment strategies. Hospital charts and medical records did little to explain what a patient could or could not do in his or her surrounding environment.

A third and equally important factor that affected the development of functional assessment efforts were the major change in vocational rehabilitation-related legislation that occurred in 1943 and that which followed in 1954. Wessen (1965) notes that the challenges to medicine brought on by the effects of World War II and a renewed sense of social responsibility toward people with physical and mental impairments, were the seeds by which rehabilitation made its most dramatic growth. The magnitude of these legislative changes would not again be rivalled until the passage of Public Law 95-603, the Rehabilitation, Comprehensive Services, and Developmental Disabilities Amendments of 1978, when federal recognition was given to independent living services as a legitimate, non-vocational goal of rehabilitation.

The inclusion of provisions for rehabilitation and training of disabled veterans under the Veterans Administration and passage

of the Barden-LaFollette Act in 1943 reinforced and enhanced opportunities for change. The importance of a philosophy of comprehensive rehabilitation led to the notion of multi-disciplinary teams as an accepted means of providing services. It was during this period that the physician began to yield complete dominance over the team care process. The Barden-LaFollette Act also broadened the organizational framework for rehabilitation by including physical restoration services to individuals with psychiatric disorders.

The extent of services and programs in rehabilitation was also enhanced with passage of three public laws; two in 1954 and one in 1956. In 1954, the Vocational Rehabilitation Act Amendment (PL 83-565) was passed as was the Medical Facilities Survey and Construction Act (PL 83-482). Together these two mandates provided for 300% increase in the capacity of client services, planning and construction grants for rehabilitation facilities, and training grants for developing professional capacity in counseling, medicine, nursing, physical therapy, occupational therapy, psychology, and social work (Wessen, 1965). The Social Security Amendments of 1956 (PL 84-880) was also important legislation as it provided a major thrust for much of the rehabilitation effort by making available case finding funds since medical certification of disability was a requirement of social security.

These three factors contributed to the surge of functional assessment activity that occurred between 1940 and 1960, each

affecting in a particular way developmental activities. Changes in the philosophy of rehabilitation from the narrow view of impairment to the holistic view, a dramatically increasing disabled population, together with the recognized need for comprehensive services and the team approach, demanded new ways of determining how best to serve clients.

The new goal was rehabilitation rather than compensation. The new plan was to increase the physical, social, psychological, and vocational capacities of the individual with the hope of improving his or her quality of life.

In the case of physical impairment, there was a proliferation of scale development during the period. The amount of activity clearly surpassed that in other areas, (e.g., mental illness, mental retardation, or vocational evaluation). This is not surprising, given the events described above. Clearly, physical impairment was a high priority at the time, with the rapidly advancing population of chronically ill and aged as well as the increase in physically impaired due to war and industrial accidents.

Functional assessment took the form of daily activity measurement. Coined by Deaver in the early 1940s, the term activities of daily living (ADL) referred to a wide range of behavior patterns considered necessary for meeting the demands of daily life (U.S. Department of Education, 1982). Most often these behavior patterns referred to an individual's performance in eating,

drinking, toileting, dressing, bathing, controlling bowel and bladder functions, and walking or wheelchair activity.

During this period, the team concept changed rapidly. Along with the increase in new professions, brought about by legislation, the older rehabilitation professions became stronger. Partly due to technological advances, hospitals and clinics replaced the home as the primary care facility. Katz, et. al. (1975) note that out of these changes new patterns of team care evolved.

These patterns were as numerous as the possible variations in size, membership, methods of operation and function.

As one might expect, chaos quickly erupted as the medical and nonmedical professions attempted to grapple with the issues of assessment standards. The primary problem was how to figure out what constitutes demands of daily life. Without an accepted taxonomy of "life demands," the variations in activity patterns represented in new ADL scales was tremendous. Three reviews of ADL scales quickly support this point. Bruett and Overs (1968) reviewed 12 ADL scales that were developed between 1951 and 1966. They present data which indicate no single activity pattern appearing across all 12 scales. In a similar study, Donaldson, Wagner and Gresham (1973) reported that only one activity pattern (dressing) appeared across the 25 scales they reviewed. Finally, in a study of 11 scales developed over the past three decades,

Hedrick, Katz and Stroud (1981) still found only three activity patterns (eating, dressing, bathing) represented in all 11 scales they reviewed.

In rare cases where scales covered the same activity, or even when they did not, there were differences in the amount of detail covered. For example, one scale covered minute details of dressing, down to each piece of clothing. Another simply asked the question, can the patient dress himself? This problem reflects the different professional viewpoints that were now bearing on the task. According to Bruett and Overs (1968), the greatest detail is required by professionals in physical restoration departments of clinics and hospitals, where small units of behavior are used for prescribing patient treatment. In the case of social workers, rehabilitation counselors, or home service occupational workers, ADL scales require less detail, as these are primarily used for making long-term care decisions and not for purposes of training.

In a 1952 review of ADL scales Hoberman and his colleagues noted that:

Daily activity measurement in physical therapy and rehabilitation is rapidly progressing from a lusty infancy toward adolescence However, daily activity measurement will have passed adolescence only when functional tests are properly graded, scored, validated, and normed, and their all-round practicability and utility demonstrated. (Hoberman, et al., 1952)

Thirty-one years later it is safe to say that, with the exception of only a very few ADL scales, development in this area remains preadolescent. Recent reviews of ADL scale development continue to raise the same issues addressed by Hoberman and colleagues in 1952 (Kelman and Willner, 1962; Jette, 1980; Keith, 1981; Klein and Bell, 1982).

Along with the new horizons set in the areas of physical impairment, so too were new horizons set in the area of mental retardation. Measures of mental (intellectual) functioning were found to be of minimal value in planning education strategies and programs for mentally retarded citizens. The measurement of IQ was of no use in describing how and in what ways clients used their mental capacities. (Reynolds and Birch, 1977; Sundberg, et al., 1978; MacMillan, 1982) It wasn't until 1947 that the Vineland Social Maturity Scale became available to professional educators and psychologists (this scale was actually developed in 1936). For the first time, there existed systematic means for assessing social competence. The scale, which is still in popular use today, was based upon an analysis of social competence comparable to the work conducted on intelligence by Binet (Doll, 1962). The Vineland scale measures the degree to which the individual has mastered certain skills expected of his or her age groups within family and community settings.

A second development was the inclusion of adaptive behavior in the definition of mental retardation. Unlike any other

impairment category, the definition of mental retardation at that time required an evaluation of environmental functioning, or so to speak. As one aspect of the current definition of mental retardation, adaptive behavior refers to:

. . . the effectiveness or degree with which the individual meets the standards of personal independence and social responsibility expected of his age and cultural group. Since these expectations vary for different age groups, deficits in adaptive behavior will vary at different ages. These may be reflected in the following areas:

During infancy and early childhood in:

1. sensory-motor skills development and
2. communication skills (including speech and language)
3. self help skills and
4. socialization

During childhood and early adolescence in:

5. application of basic academic skills in daily living activities and
6. application of appropriate reasoning and judgment in mastery of the environment and
7. social skills

During late adolescence and adult life in:

8. vocational and social responsibilities and performances. (Grossman, 1973. p. 31)

While there is much disagreement today over the value of this definition of adaptive behavior, it remains a widely accepted criterion for identification of mental retardation (McMillian, 1982). The primary argument against the definition is that it is vague and cannot be measured; that the criterion for what is "adaptive" remains unidentified (Clausen, 1972; Mercer, 1973).

Disability - 1960-1982

In previous years, the terms "impairment" and "disability" were used interchangeably as rehabilitation professionals perceived little need to make a distinction between them. Hamilton (1950), for example, defined disability as "a condition of impairment, physical or mental, having an objective aspect that can usually be described by a physician" (p. 17). This view reflects the continued dominance of the pathology-orientation, focusing on deficiencies and inabilities of the individual without fully recognizing the contribution of environmental factors, i.e., what the individual is actually capable of doing.

The pathology-orientation began to lose preeminence toward the end of the 1950s. This appears to have happened for two reasons. First, ADL scales, with all their problems, still proved more useful in describing the abilities of clients in relation to real life demands and in the subsequent prescription of treatment programs. Medical information placed emphasis on disease and impairment and was insufficient for these purposes. For example, a diagnosis of mental retardation tells the rehabilitation professional little about what the client can or cannot do with regard to daily living (functioning). Such information may be useful in describing the rate at which the client can learn, but certainly not what has been learned in light of what needs to be learned.

A second reason was the distinction between impairment and disability made by the AMA in 1958. As noted earlier, the AMA differentiated the two terms in an effort to disentangle medical and nonmedical issues relating to workmen's compensation. In the past, physicians were required to evaluate both the extent of body damage resulting from work injury and the extent to which the injury limited work capacity. This situation was resolved when the AMA removed from physicians the responsibility of delineating limitations in the work capacity. The AMA committee (1958) defined impairment as a medical condition requiring the physician's attention and also set standards measuring the condition. Disability, on the other hand, was defined as an administrative issue relating to the interaction between the impairment and a host of nonmedical factors - such as age, sex, education level, economic and social environment. Understanding how these variables interact to limit one's abilities was outside the domain of the physician. Hence, the physician was formally relieved of having total responsibility for determining compensation.

Thus, the responsibility for evaluating disability was passed from the physician to the nonmedical rehabilitation professional. It is interesting to note that the AMA committee developing the new definitions clearly recognized what they had done. They stated

nonmedical factors have proved extremely difficult to measure. For this reason, permanent impairment is, in fact, the sole or real criterion of permanent disability far more often than is readily acknowledged (p. 475).

In essence, the committee relieved physicians of their responsibility for making compensation decisions and then in the next sentence gave it right back to them.

There were many problems associated with evaluating disability. Originally, conceived as an interrelated component of impairment, disability was now seen as a phenomenon relating to every domain of an individual's functioning within the environment. The comprehensiveness of this notion made it virtually impossible to identify specific criteria for its measurement.

Burk (1967), in his review of the many attempts to define disability, identified three apparent points of agreement with regard to its nature. He concluded that, first, there is a biologic component to disability. Most often this is referred to as the impairment, pathology, or anatomic/physiologic alteration. Second, there is a psychological aspect to disability. Whether caused by the impairment or existing previously to it, Burk suggests that this aspect is often predominant. Finally, a third aspect considers the influences of the environment on the individual. Burk comments that this "sociologic" aspect of disability is completely independent of personal (meaning physical) and psychological functioning.

The search for a useful definition of disability has slowly subsided as the legal and organizational structure governing rehabilitation and education has focused efforts for professionals. Burk (1967) and Sokolow et al., (1961) note that in an unusual turnaround rehabilitation-related legislation began to tell the service delivery system how disability would be defined.

Thus, federal-level involvement in rehabilitation became a primary factor behind the development of functional assessment. Many policies and mandates affecting the lives of people with disabilities were promulgated during the period. The Office of Technology Assessment (U.S. Congress, 1982) reports that by 1982 there were over 100 federal programs serving the disabled population. The majority of these programs covered income maintenance, health and medical care, social services, educational services, and vocational rehabilitation or independent living.

The Congress and federal agencies emphasized accountability along with the allocation of public funds. Thus, federally-funded programs were required to collect data on the people eligible for services, the types of services they required, and the effectiveness of those services.

Interest in functional assessment became formalized in the early 1970s as new federal legislation governing rehabilitation held requirements for documentation of functional limitations as well as impairment. The most direct of these requirements was set

in the developmental disability section of Public Law 95-602 (The Rehabilitation, Comprehensive Services, and Developmental Disabilities Amendments of 1978). The law states the following:

The term "developmental disability" means a severe, chronic disability of a person which (a) is attributable to a mental or physical impairment or a combination of physical and mental impairments; (b) is manifested before the person attains age twenty-two; (c) is likely to continue indefinitely; (d) results in substantial **FUNCTIONAL LIMITATIONS** (emphasis added) in three or more of the following areas of major life activity: (1) self-care, (2) receptive and expressive language, (3) learning, (4) mobility, (5) self-direction, (6) capacity for independent living, and (7) economic self-sufficiency; and (e) reflects the person's need for a combination and sequence of special, interdisciplinary or generic care, treatment, or other services which are of lifelong or extended duration and are individually planned or coordinated. (Sec. 102 (2))

Federal mandates also forced service providers to focus more clearly on service delivery plans and the measurement of effectiveness. In special education, this requirement took the form of written individualized educational programs (IEPs). In rehabilitation, this requirement was the individualized written rehabilitation program (IWRP). The requirements for these plans also included data collection beyond that used for impairment categorization. Instead, there was a requirement for sampling functional capacities so that more adequate plans could be developed.

It is important to note the wide range of settings in which functional assessment devices have spawned during this period.

Variability in the purposes and goals of these settings has contributed to the variability in the ways functional assessment measures have been developed. Following the 1950s, a substantial amount of functional assessment activity occurred in association with long-term chronic care facilities. The primary populations being served in these facilities are the chronically ill and aged. Acute care institutions and comprehensive rehabilitation centers today serve a younger physically and mentally disabled population. Vocational training centers, sheltered workshops and schools serve a wide range of disabled and handicapped populations. Finally, the research data and analysis system in the United States is loosely composed of a wide variety of interest areas. Some of these include health survey and statistics research, comprehensive data collection research, and basic disease-, injury-, disability-oriented research.

Functional assessment devices were primarily developed out of the specific institutional and professional needs in response to the federal requirements for data collection. Because of this individual nature, there is great variability within and across the assessment strategies. One dimension contributing to this variation is in some respects analogous to Nagi's (1976) levels of human function. He suggested that one could focus measurement on molecules, cells, tissues, organs, body regions, body systems, or the organism as a whole. Thus, some functional assessment devices



focus on the capacities/limitations of body organs, regions, or systems as in the measurement of range in motion, arm rotation, pincer grasp, flexion and extension of fingers, or lung capacity. The same instrument, or others, may focus on composite body movements such as walking, throwing, lifting, reasoning, and climbing. Still others measure performance/skills on set tasks or activities like cooking, dressing, eating, and transferring from wheelchair to bed. Finally, additional instruments are concerned with global functioning within given environments. This is measured by distance travelled in a wheelchair, frequency of daily/weekly social contacts, days absent from work, and the conduct of typical demands of daily life, like shopping.

There are a number of other dimensions on which functional assessment devices vary. One of these is the locus of measurement. Klein and Bell (1982) and Jette (1980) consider variability on this dimension to be a major shortcoming of many previously developed ADL scales. Locus of measurement concerns the specificity of the items. Some scales are rather global and concerned with single ratings of activity patterns such as "eating" or "control of bowel and bladder functions." Health surveys also fall in this category with general items such as "daily restrictions due to illness." Other scales present items in great detail as in the breakdown of dressing skills into component parts (e.g., buttoning, pullover dress/shirt, zippering etc.).

Another dimension concerns the amount of assistance required to perform tasks (Klein and Bell, 1982). Some instrument developers scale their items according to the amount of assistance required for set standards for performance. Others make assumptions about the use of wheelchairs or other assistive devices.

Another dimension concerns scalability. Keith (1981) noted in his review of functional assessment instruments in medical rehabilitation that it is rather simple and popular to use consecutively numbered intervals which include descriptors of the amount of function. However, this approach does not guarantee that specific items are unidimensional and cumulative. Klein and Bell (1982) also comment on this issue. They suggest that instrument reliability is affected by the use of arbitrary scale values such as "almost," "often," "sometimes," "frequently," "practically never," etc. Bruett and Overs (1968) noted in their review that ADL scales varied widely on numbering systems required in scoring items. Of the 12 scales they reviewed, only one used an interval scale, 8 used ordinal scales, and three used nominal scales.

A significant trend in functional assessment is apparent during the 1960s and 1970s. While there was much confusion over the development of specific assessment devices, there were some obvious conceptual changes underlying general rehabilitation assessment practices. These changes stemmed more from additional

adjustments to our rehabilitation philosophy and concepts, rather than from changes in the philosophy and concepts themselves. During the previous period, we increasingly moved toward a holistic view of the individual, the provision of comprehensive services, and a multidisciplinary team approach. However, the goals of rehabilitation were still concerned with teaching the impaired person to use and adapt residual capacities to reach maximum vocational and living potential. Our assessment practices attempted to adjust to these concepts as new information needs became apparent. However, the primary assessment practices across most impairment categories remained focused upon the narrow pathology-oriented view of the individual.

Rehabilitation professionals began to focus more clearly on goals associated with environmental functioning and adaptation in the 1960s and 1970s. In the context of all that is rehabilitation, this change in focus appears to represent a fine tuning of previous goals, not necessarily a change in philosophy. The locus of assessment was shifted from concentration on the individual with a physical or mental impairment to the interaction between that individual and his or her surrounding environment.

Information obtained from traditional assessment approaches provided little relevant information relating to outcomes of environmental functioning and adaptation. No longer did assessments which yield diagnostic labels (Anthony, 1979; Anthony,

Cohen, and Cohen, 1983; Crewe and Athelston, 1981) and aptitude scores (Halpern, et al., 1982) help rehabilitation professionals determine the services a client requires in order to adapt to community life. These approaches assumed characteristics of the individual which remain relatively unchanged over time. In short, they were pathology-oriented and static.

The new focus on environmental interaction prompted our current assessment interest in client skills and abilities in areas such as communication, locomotion, vocational skills, and physical health. These issues are behavioral in nature and require approaches to assessment which are different from the traditional methods.

Behavioral assessment is directed toward the measurement of individual responses to particular life situations. From this view, one concentrates on what individuals **do** given real or simulated situations, rather than predict what individuals **cannot do** based upon projections of underlying characteristics. Thus, individual behavior represents a specific response to a specific environmental situation.

Individuals maintain a "response capability" which is based upon prior learning. Analogous to the notion of acquired skills, e.g., steering a car or maintaining balance on roller skates, response capabilities are the individual units of a person's behavioral repertoire (Goldfried and Kent, 1969). As such they

also represent the potential of the individual. The purpose of behavioral assessment is to understand that potential via observation of behavior samples and thereby predict future behavior.

Most scales being developed today are "skill-related" and thus behavioral in nature. Their content is focused on what Sigelman et al. (1979) calls "life functions." That is, things people do. Some examples are communication, mobility, personal care, or other specific skills.

The behavioral view is readily apparent in the areas of physical medicine and rehabilitation as noted above. The many ADL scales are in essence "skill-related." However, this view is also apparent in other areas of disability. Halpern, et al. (1982) provide a strong argument for what they term "program-related assessment" in working with mentally retarded individuals. The general notion behind this approach is that successful rehabilitation programs are those that are directly related to the assessment of desired skills. Techniques of assessment include "direct assessment of criterion behaviors in real or simulated settings, measurement of knowledge about those criterion behaviors, and evaluation of how persons with mental retardation learn new competencies" (Halpern, et. al. 1980).

Anthony, et al., (1980) take a similar view to Halpern and his colleagues. In the introductory chapter to his book on

diagnostic planning in psychiatric rehabilitation, he also suggests a more behavioral approach to assessment. He recommends that assessment focus on three things, including: (1) the client's strengths and skill deficits, (2) how these strengths and skill deficits affect the client's ability to function in specific environments, and (3) determination of the level of client skills in relation to what the client needs in order to function in specific environments. The rationale for this approach is consistent with that given in the areas of physical impairment and mental retardation. At present, psychiatric diagnostic categories do not provide much input relevant to rehabilitation outcomes (Anthony, 1979; Anthony, Cohen, and Cohen, 1983). Instead, specific skill behaviors relate more directly to rehabilitation outcomes (Anthony, et al., 1980).

Summary

In summary, this historical overview highlights a number of points that are helpful in understanding our current interest in functional assessment.

1. As our concepts about rehabilitation have changed, so too have our concepts about assessment. Originally, rehabilitation was primarily concerned with a pathology oriented view of the person with a disability. Today, this view is considered too narrow. We are primarily interested in the "fit" between an individual with a physical or mental impairment and his or her environment. Our assessment

needs and methods, while retaining the original view, have been modified to include this latter philosophical view.

2. The term functional assessment has been in use constantly since the beginning of formal rehabilitation efforts in the United States. However, the "implied" definitions of functional assessment, as well as its related terms, functional capacity and functional limitations, have not always been the same. With each new meaning the term has continued to retain a central place in rehabilitation practice. It is apparent that the term has been used when referring to:

- a. The measurement of residual anatomic/physiologic/systematic functioning following injury. Examples include the use of physical units such as degrees and pounds to measure range in motion, muscle strength, lung capacity, etc. This view was predominant during the early rehabilitation efforts when worker's compensation was the primary issue. However, the view is still in use as it relates most directly to the work of physical and occupational therapists, rehabilitation engineers, as well as to that of other rehabilitation related disciplines;
- b. The measurement of composite body movements (e.g., walking, throwing, lifting, etc.) or the relative

performance on set tasks (e.g., ADL). This view came into use predominantly during the 1940s and 1950s and has been modified somewhat to include a broader range of "things people do," such as communication, mobility, specific skills, as well as personal care.

- c. Finally, the more general view is that functional assessment refers to an individual's dynamic characteristics including activities, skills, performances, environmental conditions and needs. This includes measures of the above as well as measures such as the distance travelled in a wheelchair, number of daily/weekly social contacts, days absent from work, or typical demands of daily life, like shopping.

3. Since the early 1940s, rehabilitation has become a truly multidisciplinary endeavor. Clearly, the diverse assessment needs of the many professional groups and rehabilitation settings has resulted in communication problems when referring to functional assessment. Truly, functional assessment has meant different things to different professionals. Unfortunately, these different points of view are spread among all of our professional groups. Today, professionals within the same discipline may not even agree on which definition is being used in conversation--and more importantly in case reports.

4. Functional assessment today represents an important shift of assessment activity away from the so-called "traditional" approach to the behavioral approach. The traditional practice of measuring traits, aptitudes, and general abilities has been extensively replaced by the practice of direct measurement of skills and abilities that are required to assist the client in adapting to his or her surrounding environment.

Current Problems in Functional Assessment

Conceptual Issues

A number of reasons have been given in this paper for the recent heightened interest in functional assessment instrumentation. Among those given, were the specific institutional and professional needs brought on by rapid expansion of the field, philosophical changes in our notions about the rehabilitation process, and various federal mandates calling for more accountability and evaluation of outcomes in rehabilitation practices.

All of these factors have led to the resolution of some rehabilitation assessment needs, especially those of specific institutions and professional groups. At least on a local level, many assessment methods and procedures have resulted from addressing issues such as the level of detail included in instrument items, scoring and grading procedures, frames of reference, measurement

approaches (e.g., attitudes, self-reports, and direct observation of behavior), and the content areas that are addressed. In general, these kinds of procedural and format modifications and refinements are necessary and expected if the field is to make progress. To the degree that these changes are appropriate, one would expect that the number of instruments being refined or developed over time would diminish to a low, but perhaps, steady rate. However, this has not been the case with functional assessment in rehabilitation. The rate of development continues to increase, as perusal of any rehabilitation-related journal will indicate. Rarely is a journal edition published without at least one article concerning assessment issues.

Instead, the proliferation of assessment formats and procedures has created serious problems for the field. These problems (1) include poor ability to communicate among the many divergent professional disciplines involved in the rehabilitation process; (2) disagreement over rehabilitation goals and outcomes; (3) lack of comparability among substantive research efforts, and (4) frustration among epidemiologists and policymakers, who are perplexed by the inability of rehabilitation professionals to explain rehabilitation problems in ways that allow for consistent aggregation of descriptive data.

A number of researchers have periodically studied one or more of these problems over the past 30 years (Whitten, 1975; Backer,

1979; Indices, Inc., 1979; UCIR, 1981; Brown, et al., 1982).

While the specific conclusions vary according to the types of questions raised in their studies, all are based upon the same premise. This premise is concisely stated by Sigelman, et al.

(1979):

As problems of the handicapped became increasingly visible in society, it becomes increasingly, often painfully, apparent that the rehabilitation community has only a loose grasp on the nature of the problems that handicapped citizens face - indeed, on the nature of handicap itself. (p. 103)

In essence, rehabilitation professionals do not have a complete understanding of the causes, consequences of, or factors affecting disability. Let us explore this further.

Burk (1967) notes that the terms "rehabilitation" and "disability" lack conceptual consistency across all of the potential conditions and situations to which they are applied. As noted earlier, there has been a tendency to develop definitions that are in keeping with the specific purposes and interests of the group doing the defining. This results in communication becoming difficult, and even counterproductive, as these definitions are applied in different programs and by different professional groups. He concludes, that without universal acceptance of precise terminology, research assessing the effectiveness of rehabilitation programs or establishing the validity of services and techniques will have little meaning.

Speaking to this same point, but more directly to assessment issues, Keith (1981) suggests that measurement problems in medical rehabilitation have persisted as a result of an inability to formulate adequate assumptions about restorative treatment. As noted earlier, how one views the condition of an individual with a disability will influence the measurement strategy. The same can be said about the way each professional views potential treatments, and how these might affect the individual (or more specifically the original condition): Thus, the underlying assumptions about conditions and treatments concern the very nature of disability itself.

These conceptual problems are nowhere more apparent than in attempts to gather epidemiological data on the disabled U.S. population. The Bureau of Social Science Research, Inc. (BSSR, 1981) reported that estimates of persons who are "work disabled" have ranged between 12 million in the early 1970s to 21 million in 1978. In addition, the overall prevalence of disability varies between 13 and 31 percent depending on the source referenced. BSSR attributes these wide-ranging figures to three kinds of problems, two of which are by now familiar.

The first problem concerns the variability of definitions of disability and handicap that are written into law. BSSR compared three definitions, one from the Social Security Act, one from the regulations of Section 504 of the Rehabilitation Act Amendments of

1978, and one from the Rehabilitation Services Administration. They note that the Social Security Act considers a person eligible only if he/she has not participated in gainful employment for one year due to impairment.. The Rehabilitation Services Administration requires that a reasonable expectation of employment be established prior to program participation. The Section 504 regulations, which fall under the U.S. Department of Education and the U.S. Department of Health and Human Services, define handicap as a physical or mental impairment that substantially limits "major life activities." The effect upon incidence rates using these various definitions is obvious. The agencies mentioned here are serving essentially different populations. In the case of the liberal Section 504 law, the Department of Health and Human Services is most likely reporting figures that overlap with one or both of the other two agencies.

The second problem concerns the divergent sources of data from which the incidence figures were drawn. These included eligibility statistics from the various agencies that serve disabled persons, service delivery data, and sample surveys. With regard to eligibility data, it is interesting to remember there are over 100 different federal programs serving disabled persons and both reports from the BSSR (1981) and the U.S. Congress (1982) suggest that eligibility requirements are less comparable than they are more comparable. Clearly, the aggregation of these types of data raise more questions than they could possibly answer.

The third problem concerns the use of inconsistent methodology in identifying disabled persons. BSSR reports that some surveys rely on a combination of diagnostic categories and limitations in life activities, while others may rely on only one of these. The surveys differ in the content areas that are covered. Some ask only global questions about restrictions in daily activity, others consider several individual questions about daily activities. Further, BSSR notes that surveys tend to differ on the coverage of those reasons or conditions that lead to time away from work or normal daily activities.

In recent years, there have been a number of attempts to gain a conceptual understanding of disability. Two models in use today are those elaborated by Nagi (1965; 1969; 1976; 1979) and Wood (1975; 1978a; 1978b; 1980; 1981) who completed his work in service to the World Health Organization (1980). Both systems attempt to describe the consequences of injury and disease as these result in chronic illness, impairment, and the loss of societal roles, rights and responsibilities.

Wood and Badley (1981) provide an excellent theoretical background which is applicable to both models of disability. As acute illnesses become controllable due to advances in medical science and technology, chronic illnesses become more important. Wood and Badley cite as examples the conditions of diabetes and pernicious anemia, which can be controlled even though their

underlying causes remain. In these cases, the diseases have less relevance to traditional health care systems, since they no longer reflect the basic outcomes of cure or prevention.

Health care systems are currently equipped to diagnose, describe, and classify those residual conditions of chronic illness that are potentially amenable to prevention or cure. However, Wood (1980) notes, health care systems are currently unequipped to diagnose, describe, and classify conditions that are not amenable to cure or prevention in the context of medical science and technology. Problems such as the residual conditions and effects of mental retardation, mental illness, heart disease, arthritis, etc., are left unattended. In essence, the medical model of illness ends with disease and does not adequately account for the consequences of disease.

This is the point where the two models of disability begin. Nagi (1976; 1979) suggests a conceptual model, outlined in Figure 2. The model begins with the disruption of normal body system processes. This is labelled active pathology. The disruption elicits an immediate response by the organism to restore the previous or normal state. In some cases where active pathology cannot be cured or is only controlled, impairment results.

Insert Figure 2 about here

Impairment refers to a "physiological, anatomical, or mental loss or other abnormality, or some combination of these" (1979; p. 26). Nagi suggests that the occurrence of impairment and active pathology can overlap but that distinctions between them are more easily understood when impairment does not have active pathology associated with it. By his definition, however, active pathology is always accompanied by impairment. Impairments can vary on the levels of capacity and functioning they can affect, such as body system, organ or part. Examples of impairment include range in arm motion, loss of pincer grasp, and vision loss.

Nagi draws a distinction between the levels of organization at which limitations are manifested by the organism. Lower level functional limitations connote impairment. Higher level limitations in function refer to an inability of the organism **AS A WHOLE** to perform activities. Examples of the latter are walking, climbing, lifting, reaching, reasoning, and seeing. These are also formally referred to as functional limitations, but at a different level. Thus Nagi distinguishes between two essential types of functional limitations.

Functional limitations can result in an inability to perform an expected social role, such as engaging in employment. When this occurs as a result of impairment, the individual is said to have a disability, formally defined as "a form of inability or limitation in performing roles and tasks expected of an individual

within a social environment" (p. 27). These tasks and roles are aggregated into sphere of life activities, including self-care, education, family relations, personal relations, recreation, economic life, and employment and other vocational concerns. Nagi points out that not every impairment results in disability, and further, that similar patterns of disability can result from different functional limitations and impairments. He further suggests that understanding the causes of disability is a complex issue requiring the employment of multiple assessment measures.

Wood (1980) presents a model of disability that, upon close review, closely resembles the one developed by Nagi. However, there are some important differences between the two. Using the model outlined in Figure 3, Wood describes four "planes of experience."

The first plane is associated with disease and represents the fact that a chain of causal circumstances (disease) results in changes in the structure or functioning of the body (the pathology). Sometimes these changes become obvious, as with symptoms and signs. The second plane represents the point where one becomes aware of these changes. Thus, the pathological state is said to be "exteriorized" or made known. It is usually the individual who makes this recognition. The term impairment is used in referring to "any loss or abnormality of psychological, physiological, or anatomical structure or function" (p. 4). These

occur at the organ level and can be described in terms of temporary or permanent abnormalities, such as defects, loss of a structural body part (kidney, lung, arm, etc.), or a malfunctioning system or mechanism of the body. Wood also considers mental functioning in this latter category.

Insert Figure 3 about here

The third plane is experienced as performance or behavior is altered due to an impairment. The experience becomes "objectified" as normal activities of the individual are restricted. Wood refers to these restrictions as disabilities. Defined, they refer to "any restriction or lack (resulting from impairment) of ability to perform an activity in the manner or within the range considered normal for the human being" (p. 4). Where impairments are concerned with functions of body parts, disabilities represent integrated body functioning such as that which is required to complete tasks, skills, and behaviors.

A fourth plane is experienced if a disability places the individual at a disadvantage relative to others. Representing society's response to the individual, Wood refers to this as a handicap. He defines handicap as "a disadvantage for a given individual, resulting from an impairment or a disability that limits or prevents the fulfillment of a role that is normal

(depending on age, sex, and social or cultural factors) for that individual" (p. 4). Presented as a social phenomenon, handicap represents those disadvantages that result from being unable to conform to social and cultural norms. X

While the category labels differ, Nagi and Wood actually employ similar definitions. Disease and active pathology are relatively compatible, as are the two definitions of impairment. On close inspection, the Wood definition of disability is quite similar to Nagi's functional limitation (see Nagi's progression Level III). It is interesting to note that Nagi uses the term functional limitation at both progression levels II and III. In each case, the term is consistent with Wood's corresponding definitions of impairment and disability. The reader will note both progression level III definitions refer to the consequences of "organ" level impairment manifested at the level of the person.

At the fourth (and final) progression level, Wood defines handicap and Nagi defines disability. Again, category labels differ, but the definitions are quite similar in their intention. Both researchers consider the effects of the environment on the individual at this level. However, they differ on the point of view. Wood refers to a disadvantage placed on the individual by the environment. This disadvantage can change depending on the environment in which one lives; and the individual has relatively little direct control over these functions. Nagi, on the other hand,

places emphasis on the individual's inability to perform up to expectations in the environment in which one lives.

Nagi does explain handicap in discussions that accompany his model. He comments that the literature generally depicts handicap the same way he chooses to describe functional limitations - referring to limitations in walking, vision, hearing, reasoning, and so forth. Nagi states, "handicaps or limitations in function could be of a physical, mental, or of a sensory nature." These are reflected at the person level of functioning. He essentially dismisses the issue of disadvantage.

The definition of "handicap" forwarded by Wood, on the other hand, is consistent with research on the effects of the environment on persons having disabilities. The issue of employment serves as a good example. One may reduce the effects of particular skill disabilities through vocational training. The client may become quite proficient in a particular vocational area - perhaps far beyond "normal" proficiency for workers in this area. However, due to factors outside the person's control, such as employer attitudes and high unemployment in the economy, the person fails to obtain gainful employment. Noble (1979), in his review of employment policies and programs in the U.S. and northwestern European countries, noted that only one of 14 factors related to employment outcomes in rehabilitation are directly related to rehabilitation services. He highlights the point that

"getting a job" is related to many factors outside the direct control of persons having a disability or the rehabilitation professional.

Nagi's notion of disability clearly does not fit this point of view. He places emphasis on the individual's inability to get a job. This seems a bit harsh, given the fact that obtaining a job most likely does not relate to an objective view of the individual's work abilities but more to the fact that the overall economic environment precludes employment. It appears that the term "handicap" is the appropriate term for such situations.

It should be mentioned that a number of other notable efforts have been undertaken in the area of functional classification systems. Some of these include the Manual on Technology and Classification in Mental Retardation (Grossman, 1973); the Index of Well-Being (Kaplan, Bush, and Berry, 1976); Taxonomy of Life Function Needs (Dudek, et al., 1977); the Rehabilitation Indicators (Diller, Fordyce, Jacobs and Brown, 1979); the Functional Assessment Inventory (Crewe and Athelstan, 1981); the Long Range Evaluation System (Granger, 1980); the Functional Capacity Areas (Indices, Inc., 1979); and the Health Insurance Study (Brook, et al., 1979). Most of these studies refer to the development of single assessment devices which are then used to determine functional needs in a population of physically or mentally impaired persons. Their specific purposes, approaches,

and foci are many. The primary reason they were not selected for review here is that the classification systems often cut across two or more of the four conceptual categories identified by Nagi and Wood. To include them all here would require more space than is available in ironing out the potential confusion.

Technical Issues

The development of functional assessment instruments with good technical quality has proven to be a most complex and elusive undertaking. Devices developed over the past 30 years have, with a few exceptions, contributed little to global rehabilitation efforts. In general, it is fair to say that most devices have little utility outside of the specific institutional settings in which they were developed. X

Moreover, the literature on functional assessment is replete with references to the poor measurement properties of the current devices in use. Especially appalling is the lack of measurement data on many tests. Recently, the Regional Rehabilitation Research Institute at the University of Michigan reviewed 40 client assessment measures in rehabilitation (Harrison and Garnett, 1981). The authors reported on the purpose of each test, how it should be used, all test development data concerning reliability and validity, as well as a sample of the kinds of items covered. The instruments represented five categories

including measures of employability, independent living skills, client perceptions, client satisfaction, and miscellaneous. A detailed analysis by this writer of the reliability and validity data presented in the report prompted the following conclusions:

1. With regard to the reliability issues, 23 percent (9) of the 40 instruments reported no reliability data at all; another 43 percent (17) reported poor, inappropriate or incomplete reliability data; only 35 percent (14) reported both adequate and appropriate reliability data.
2. With regard to validity issues, 25 percent (10) reported no validity data; 50 percent (20) reported poor, inappropriate, or incomplete validity data; only 25 percent (10) reported legitimate validity data, and one of these was still questionable.

Despite all this, the poor technical quality of many functional assessment devices has more to do with a lack of agreement over **what** is being measured than it does with blatant disregard for sound measurement technology. This problem has been referred to as the criterion problem by Kelman and Willner (1962), and Keith (1981) and Messick (1980). There can be little hope for appropriate measurement in rehabilitation without agreement and clear understanding between test users and test developers concerning the characteristics of the construct(s) being measured. Terms such as **independence, employability, quality of life, and**

activities of daily living are broad and do not currently enjoy common understanding either across or within the diverse rehabilitation-related disciplines.

Another part of the problem is that our views of assessment are instrument-oriented and not process-oriented, thereby failing to recognize the true complexity of the rehabilitation process. Assessment, as noted earlier, refers to the process of gathering data, not the administration of a single instrument. Keith (1981) points out that the ambitious goals of rehabilitation interfere with adequate instrument development. "Comprehensive" or "total" rehabilitation (Wright, 1980) is intended to influence nearly every sphere of an individual's life. In this case, rehabilitation refers to "the restoration of the handicapped to the fullest physical, mental, social, vocational, and economic usefulness of which they are capable" (Bitter, 1979). Any attempt to capture, through single measures, an individual's status in a way that reflects all that is important to the rehabilitation process is ostentatious, to say the least.

The study cited earlier by Cook (1978) provides a good example of the criterion problem. Cook observed a weak relationship between the types of rehabilitation service recommendations made and employment outcomes. It should be mentioned that this study concerned the results of an assessment process involving multiple assessment devices and team decisions.

The author assumes that employment is a legitimate outcome of these decisions, i.e., that the criterion is employment status. One might question whether there is clear agreement on the assumptions which underly, for example, vocational skill evaluation devices or employment interest inventories. It could be argued that such devices are only relevant in determining the type of training program in which a client will make the greatest skill gains or be most interested, but not necessarily become employed as a result of participation. Peterson and Burck have pointed out the importance of making distinctions between program "outputs" and "outcomes."

Outputs refer to the new knowledges and skills acquired by clients during educational or therapeutic treatment processes. Outcomes . . . are the resultant or consequent effects of the acquisition of new competencies following treatment (p. 493).

Measurement specialists argue over whether or not the criterion problem is a true validity issue (Messick, 1980). Kelman and Willner (1962) suggest that it is not a validity issue, but a precondition for the development of useful measurement devices. Without it, validity coefficients will in all probability be low. If, for example, one defined physical restoration in the following way, "to increase client abilities to perform a variety of dressing skills," then assessment would more likely include a review of anatomical/physiological limitations (test of muscle strength, range in motion, pincer grasp, etc.). However, if the

definition of physical restoration were "to increase dressing behavior," then most likely a larger set of measurement devices is required (perhaps measures of physical limitations, as well as psychological functioning, social functioning, etc.). Why an individual does or not dress him or herself is potentially influenced by numerous environmental factors, all of which may be out of the control of the attending rehabilitation professional. If the goal is intended to be actual change in behavior, then this would require a totally different measurement approach.

Potential Solutions

Functional assessment has been a topic of concern in rehabilitation since the beginning of workers' compensation in 1908. However, our present intense interest in functional assessment represents a professional response to the inadequacies of traditional assessment approaches as these are applied to current rehabilitation philosophy and concepts. Functional assessment speaks more directly to the important variables affecting the interaction between client and environment. These variables are abilities, skills, and performances measured under environmental circumstances that are relevant for the individual client. This view recognizes the changing nature of the environment, social roles, and individual circumstances over time. It is thus possible to measure changes in the status of the relationship between the client and his or her environment.

Functional assessment as described above is a new type of assessment. Its arrival on the scene begins to fill a long recognized gap in our rehabilitation efforts. However, unless careful attention is paid to how it is used, functional assessment will continue to fail us in our greater rehabilitation efforts. We must address four broad concerns in the process of adapting functional assessment to substantive rehabilitation practice.

Conceptual consistency. The first concern is the problem of conceptual consistency in the way we use the terms impairment, disability, and handicap. As discussed above, there have been a number of attempts to resolve this problem. The most recent, and logically sound, attempt was put forward first by Phillip Wood (1978) and later under the auspices of the World Health Organization (1980). According to Wood, the relevant consequences of disease are recognized as impairments, disabilities, and handicaps. He emphasizes the important differences between these consequences of disease, representing as they do three distinctly different experiences of the individual. The three definitions are again presented in Figure 4, this time along with a number of other variables that facilitate better understanding of the

Insert Figure 4 about here

relationships among them. The consequences of disease are

experienced by the individual first as a recognition of abnormality in body structure or appearance and organ or system function (exteriorization). As a result, performance or behavior may be altered and therefore, "normal" activities become restricted (objectification). The individual experiences a handicap as he or she may be placed at a social disadvantage as a direct result of restricted performance (socialization).

Each concept reflects a unique type of loss or abnormality. As noted in Figure 4, impairments refer to abnormalities within the individual. These are losses of structure or function of individual body parts and are manifested at the organ or mechanism level. Wood suggests that disabilities refer to restrictions in those compound and integrated activities, tasks, skills, or behaviors, which are in turn manifested in the individual's unique activities, tasks, skills, or behaviors. Finally, handicaps refer to disadvantages with regard to complex survival roles which are recognized in society, and which are manifested in the attitudes and responses of other societal members.

Norman Acton (1979) has suggested how society can best respond to these levels of impairment, disability and handicap. Treatment for impairment is most appropriately approached by the prevention of future impairments, since in many cases impairment is a relatively static phenomenon. Disability is a rehabilitation issue dealing with the improvement (or enhancement) of functional

capacities. Finally, handicap, as the final consequence of disease, is an educational issue. The "treatment" for handicap requires educating nonhandicapped members of society as well as persons experiencing impairments or disabilities.

Functional assessment as defined by the current movement refers to assessment at the level of disability. This is consistent with the holistic philosophy of rehabilitation; i.e., that disability is composed of many physical and mental functions that are greater than the sum of each individual function. Hence, a disability is experienced by the whole person.

In view of these concepts, one can easily recognize why the terms functional assessment, functional limitations, and functional capacity have confounded our assessment efforts in the past. Depending on when in history they were used, each definition could legitimately refer to the assessment of impairment, disability, or handicap. Prior to 1940, any (or all) of these terms were used when referring to the measurement of residual structure or function of individual body parts (impairment).

Since the 1940s, use of any of the three terms--functional assessment, functional limitations, or functional capacity--could have been applied to measurements of impairments, disabilities, or handicaps. The greatest likelihood for knowing what referred to what was taking into account the professional discipline of the

person using the term. Health care professionals and physical/occupational therapists were most likely referring to the assessment of impairment. Rehabilitation counselors, educators, and psychologists could be referring to the assessment of impairment but most likely to the assessment of disability or handicap. Whatever the case in the past, today, functional assessment most appropriately refers to an assessment within the category of disability.

Acceptance of the WHO (1980) terminology resolves problems associated with the inconsistent use of the term functional limitations. These are considered an aspect of impairment, relating to the individual functions of the parts of the body or thought processes. In addition, it makes little sense in labeling the assessment of functional limitations as anything other than just that. Use of the term functional assessment as a label would be inappropriate given our current definition of the term. Also, it would be inappropriate given that functional assessment refers to a type of assessment rather than to an object of assessment. A functional limitation is an object of assessment. Here the word functional cannot be separated from the word limitation, otherwise the term loses its meaning. Conversely, applying the term functional limitations to issues of disability makes little sense for historical, practical, and now definitional reasons.

Functional capacity, on the other hand, clearly relates to disability. Webster's New Collegiate Dictionary (1979) defines

the word capacity as ability. Hence functional capacities are most appropriately the object of functional assessments. Given this view, a functional assessment refers to the assessment of functional capacities. Unfortunately, the term functional capacity has also been used interchangeably with functional limitation; the former referring to a positive view of the individual, the latter a negative view. Capacity in this case directly refers to potential. Actually, functional limitations is a neutral term, referring to an objective characteristic of body function. Given this view, it would appear an easy task to drop the use of functional capacity as a positive equivalent to functional limitations.

Proper context. The second concern is the need to place functional assessment in proper context with rehabilitation assessment needs and practices. There are several primary variables that must be taken into account. First, one must recognize the multiple dimensions of the consequences of disease, as discussed above. These dimensions are appropriately labeled impairment, disability, and handicap. Selection of any one of these categories would have clear implications for the content and focus of assessment activity. Second, the goal or purpose must be specified. The major distinction here is between norm-referenced and domain-referenced assessment. The two types of measures are used for entirely different purposes. Norm-referenced measures yield information about an

individual's status or standing relative to other persons. Domain-referenced measures, on the other hand, are concerned with an individual's status relative to a domain (content area) of information or skills. Third, it is important to recognize the locus of measurement, or the level and type of detail required by the test user; and, thus, built into test items. This variable ranges from detailed and concrete items (as required for setting specific IWRP goals) to very general and abstract items (as required for census surveys or reports to state and federal agencies). Only three levels of detail--highly detailed, moderate detail, abstract--are specified.

Taken together, the three variables can be represented in a three dimensional matrix (Figure 5). Both test developers and test users can apply the matrix to determine the type of assessment device they are aiming to develop or needing to use. For example, an assessment device such as the one labeled A in Figure 5 could represent a review of performance on personal care activities (such as dressing, bathing, and eating). This instrument would have carefully detailed items--perhaps in task analysis form. The information gathered using the device would be most useful in setting immediate objectives and devising strategies for improving performance in the area assessed.

Insert Figure 5 about here



An assessment device such as the one labeled B in Figure 5 might represent an intelligence test. The test would measure general intellectual functioning. It would be norm-referenced and items would most likely be at the moderate level of detail.

Classification system. The third concern is to adopt a classification system for each of the categories of impairment, disability, and handicap. Without a classification system, it will be difficult to develop the close correspondence between assessment and the primary data needs for human service systems. In addition, we will continue to develop assessment devices that are composed of bits and pieces, rather than having comprehensive and systematic coverage of relevant categories. We have seen this problem most extensively in the development of ADL scales, where no two measures cover the same activities, yet many of these scales enjoy wide regional use. Such practice only serves to confound communication efforts and comparability of research findings.

More rigorous test development practices. Finally, the fourth concern relates to the laissez-faire attitude of both test developers and test users toward adequate test development practices. There are important responsibilities which lie with the test user as well as with the research community providing new tests. As noted earlier, many of our current functional assessment devices lack adequate theoretical and technical

characteristics. Many of these devices are marketed or distributed without careful consideration for sound measurement requirements. All too often, support data concerning the reliability and validity characteristics of a particular device are not readily available in detail or summary form.

The American Psychological Association (1974) has produced a set of guidelines for test developers as well as test users. The guidelines cover the measurement requirements of educational and psychological tests, the types of information and data that should accompany tests, and qualification requirements and concerns of test users. Closer adherence to these guidelines would yield immediate profits for rehabilitation practice. X

There are a few things we can do to formally assist the functional assessment effort in this regard. Our current assessment monitoring system is rather informal and slow. We could facilitate test development with the implementation of a formal test review mechanism. Buros Mental Measurements Yearbook (1978) is a good example of one way researchers can police their own work. Buros provides a framework for describing tests and summaries of current research applications. This type of format would also greatly assist test users in selecting appropriate rehabilitation measures. More importantly it would provide a focus for presenting the relevant test characteristics and recent research. X



Another format that appears appropriate is that provided by the Journal of Educational and Psychological Measurement. This journal is a quarterly publication devoted to issues on the development and application of measurement devices. The publication is a useful focus for researchers and other test developers. However, it is most likely of minimal value to test users and other direct service delivery personnel due to the technical nature of many articles and the relatively minor interest direct service providers would have in all assessment issues.

Users of rehabilitation tests and measures need to monitor their own test-use practices as well. One way of accomplishing this is to begin formal reviews of assessment devices through subcommittees of relevant associations--such as the National Rehabilitation Association (NRA), the American Congress of Rehabilitation Medicine (ACRM), the Council of State Administrators in Vocational Rehabilitation (CSAVR), or most appropriately the National Association of Rehabilitation Research and Training Centers (NARRTC). The primary purpose of such reviews is to protect direct service providers by insuring that useful and adequate test information is available on potential assessment devices. The review would not necessarily be expected to recommend one assessment device over another, but simply advise interested persons of available information, current research, and



the extent to which particular devices meet APA guidelines for test development.

In conclusion, the complexity of the problems associated with assessment in rehabilitation is a reflection of the complexity of the field itself. The explosion of words is an indication of how readily our field has grown and changed. But the time has come to pause and decide upon a system that embodies the similar conceptual clarity as that of the medical model for data needs, assessment and classification. An important prerequisite is an agreement upon consistent terminology. Ultimately, we must agree upon efforts to police our assessment approach for both conceptual and technical quality.

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Fig. 1. Demonstration of Relationships Among Data Needs, Assessment, and Classification Systems

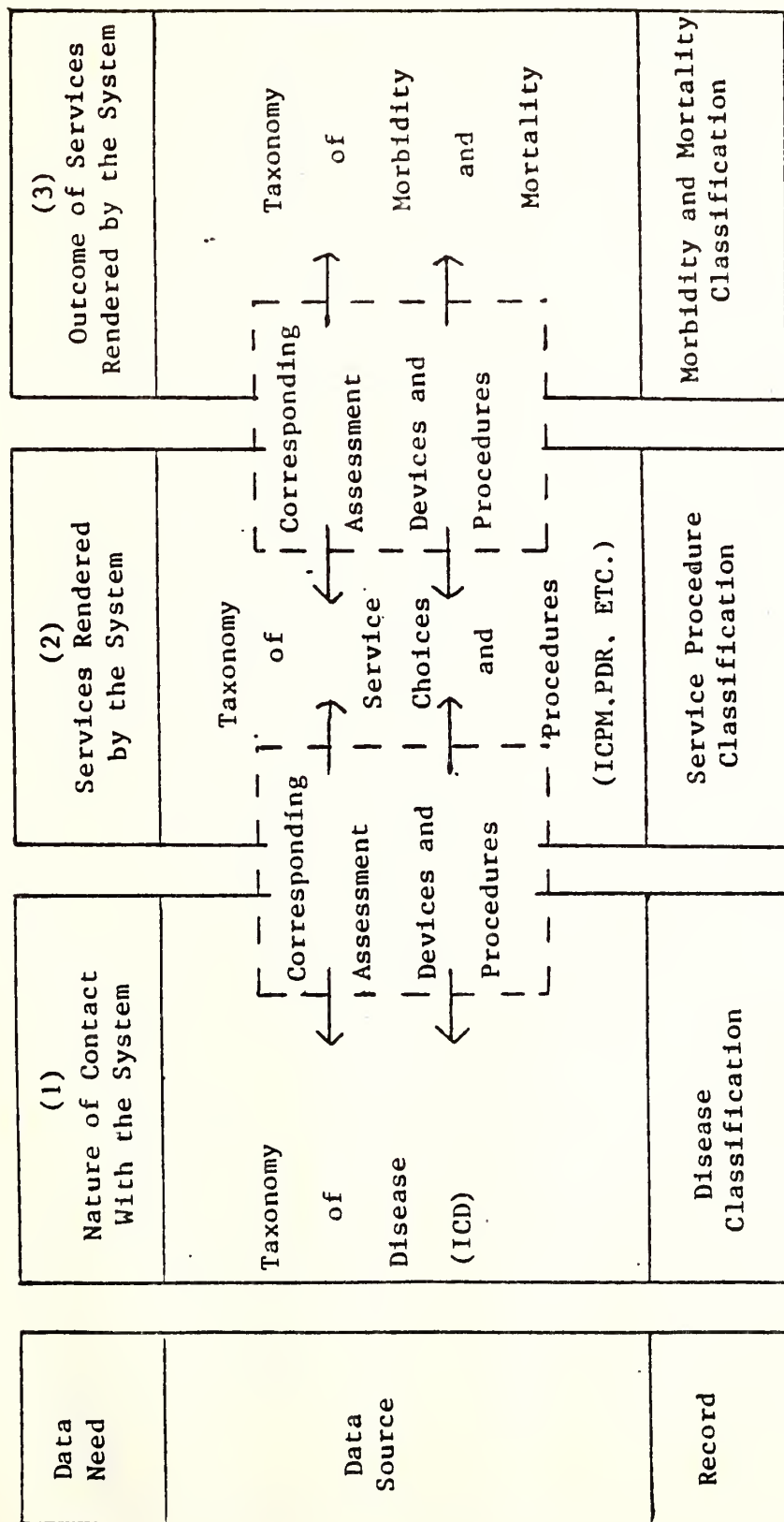


Figure 2. Conceptual model developed by Nagi.

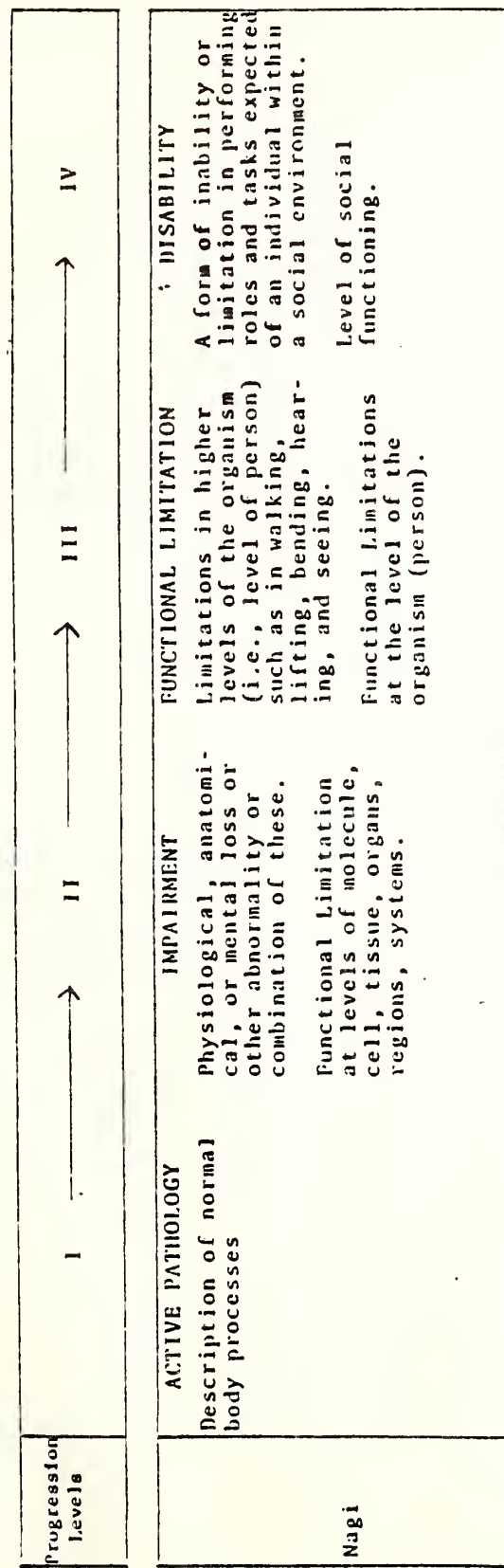


Figure 3. Conceptual model developed by Wood.

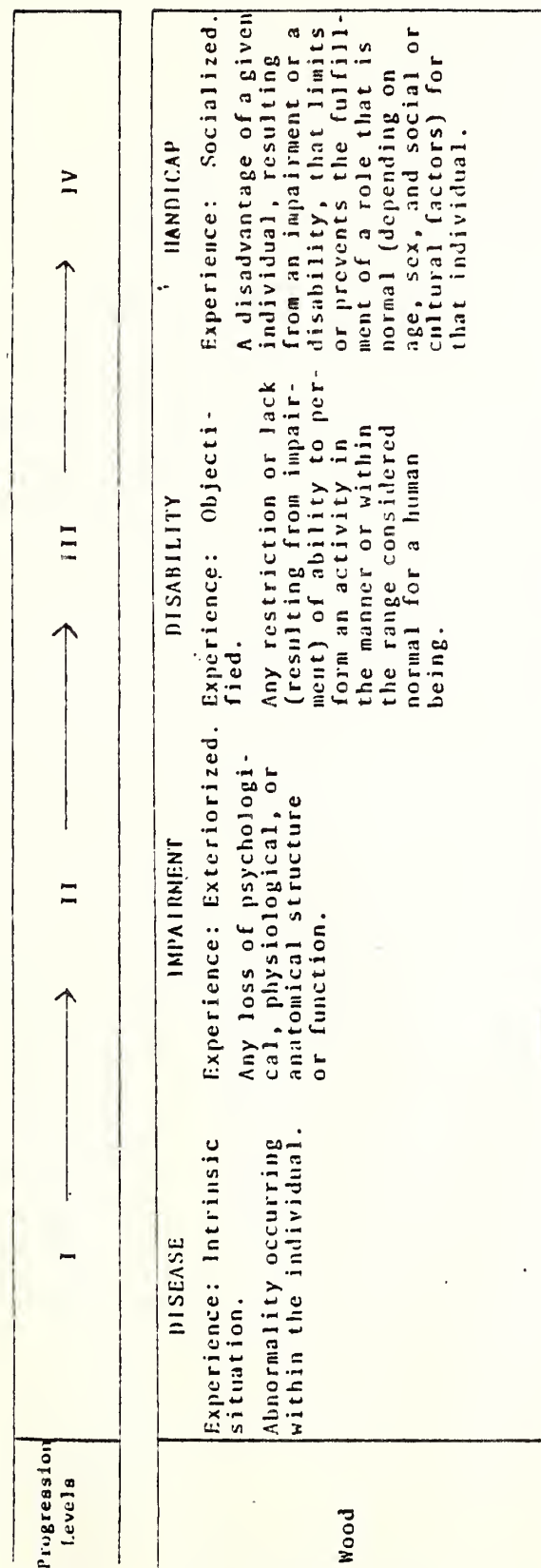
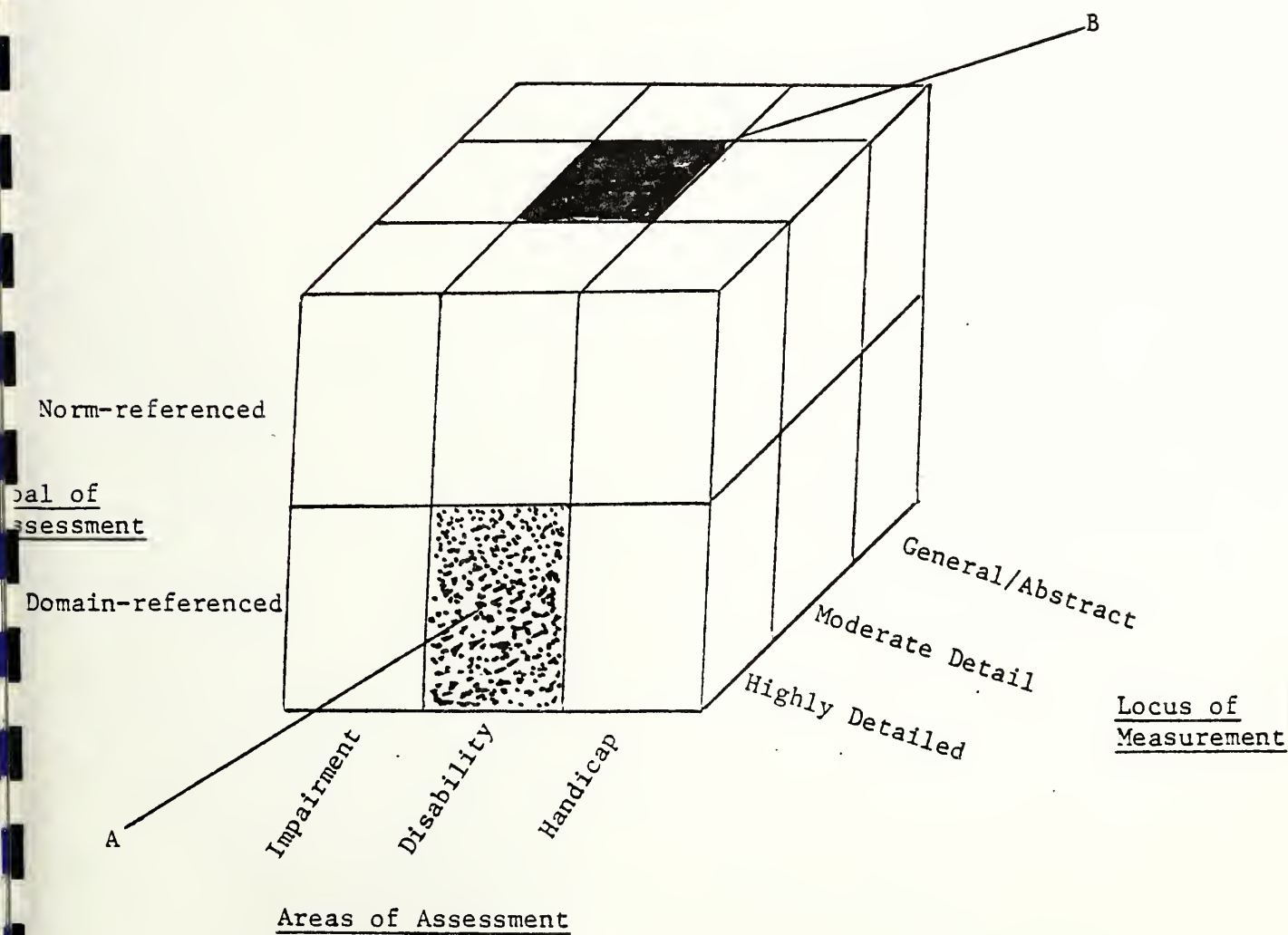


Fig. 4. The Consequences of Disease (and Accident, Birth Defect, or Malnutrition)¹

Consequence of Disease (Phase of Experience)	A Definition of the Consequence ¹	B Type of Loss or Abnormality	C Type of Manifestation	D Treatment Action ⁴
Impairment (Exteriorization)	any loss or abnormality of <u>psychological, physiological or anatomical structure or function.</u>	structure or function of individual parts of human body	organ or mechanism	prevention
Disability (Objectification)	any restriction or lack (resulting from an impairment) of <u>ability to perform an activity</u> in the manner or within the range considered normal for a human being.	compound and integrated activities, tasks, skills, behaviors	individual (person's) activities, tasks, skills, behaviors	rehabilitation
Handicap (Socialization)	a disadvantage for a given individual (resulting from an impairment or a disability) that <u>limits or prevents the fulfillment of a role that is normal</u> (depending on age, sex, social, cultural factors) for that individual.	a complex survival role which is appropriate (based on age, sex, social and cultural factors) for an individual (person)	attitudes and responses of persons experiencing a handicap and not experiencing a handicap	legislation and education

¹ Adapted from Bettinghaus, Carole O. "International Standards for A System of Disability Classification." Paper presented at the Annual Meeting of the American Psychological Association, Montreal, 1980.

Figure 5. Matrix of Assessment Needs
in Rehabilitation



INTERIM REPORT OF THE
AD HOC COMMITTEE ON
VISUALLY IMPAIRED ELDERLY PERSONS

SEPTEMBER, 1972

THE CARROLL REHABILITATION CENTER FOR
THE VISUALLY IMPAIRED, INC.
NEWTON, MASSACHUSETTS

